

REMARKS/ARGUMENTS

Status of the Claims

Claims 1-2, 4-8, 10-18, and 44-73 are pending in the subject application with claims 1 and 46 being the only independent claims. Claims 3 and 9 have been previously cancelled without prejudice or disclaimer. Claims 19-43 have been cancelled in view of the Restriction Requirement.

New claims 62-73 have been added. New claims 62-63 are supported by Fig. 1 of the subject application (*see*, applicants' published application in US 2008/0035941). New claims 64-66 are supported by paragraph [0018] of the published specification. New claim 67 is supported by original claim 1. New claims 68-73 correspond to new claims 62-67 but depend from independent claim 46. No new matter has been added.

Reconsideration of the subject application is respectfully requested.

Overview of the Office Action

Claims 45 and 47 have been rejected under 35 U.S.C. § 112, second paragraph.

Claims 1-2, 4-8, 10-18, and 44-61 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over US 6,291,839 to Lester.

Amendments Addressing Informalities

Claims 45 and 47, as amended, recite that "the epitaxial multilayer structure of the semiconductor chip is free of a growth substrate." As one skilled in the art will appreciate, an epitaxial multilayer structure requires a growth substrate on which the multilayer structure is epitaxially grown. In the subject application, the growth substrate is removed from the multilayer structure (*see*, e.g., Fig. 1). The resultant semiconductor chip is thus free of a growth substrate.

In view of the above, the 35 U.S.C. § 112, second paragraph, rejection has been overcome.

Summary of the Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The present specification describes a radiation-emitting thin-film semiconductor chip (10), as is generally shown Fig. 1 of the subject application (Fig. 1 is reproduced below for the Examiner's convenient reference):

FIG 1

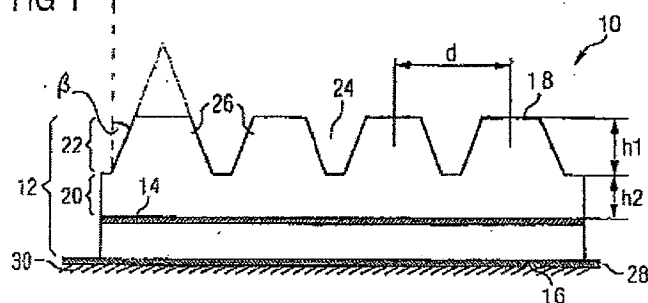
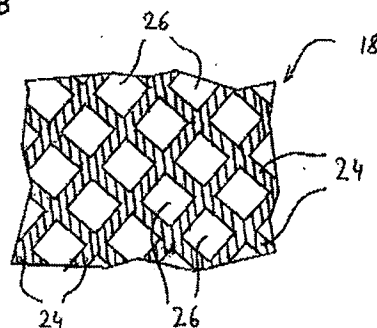


FIG 9B



The radiation-emitting thin-film semiconductor chip (10) comprises an epitaxial multilayer structure (12) and a reflective layer or interface (28). The epitaxial multilayer structure (12) comprises an active, radiation-generating layer (14), a first main face (16), and a second main face (18) remote from the first main face (16) for coupling out radiation generated in the active, radiation-generating layer (14). The first main face (16) of the multilayer structure (12) is coupled to the reflective layer or interface (28).

The multilayer structure (12) also has a patterned region (22) that adjoins the second main face (18) of the multilayer structure (12). The patterned region (22) comprises convex elevations (26) defined by either one- or two-dimensional depressions (24) (see, Fig. 9B above).

In one embodiment, the convex elevations (26) have a height (h1) at least as large as a distance (h2) between the patterned region (22) and the active, radiation-generating layer (14).

Patentability of the Claimed Invention

A. Independent Claims 1 and 46 are Not Obvious Over Lester

Independent claims 1 and 46 each recite “a patterned region of the multilayer structure that adjoins the second main face of the multilayer structure is patterned by either one- or two-dimensional depressions forming convex elevations.” The above recited claim features are not taught by Lester.

When rejecting independent claims 1 and 46, the Office Action interprets Lester to disclose one or two dimensional depressions forming truncated pyramids (see, e.g., pg. 4, ll. 3-5 of the Office Action). Applicants disagree.

Lester teaches a light emitting device (LED) having a finely-patterned reflective contact.

In the Examiner-cited portions, Lester explicitly teaches that:

FIG. 5 illustrates another preferred embodiment. The top surface of the LED has been roughened, preferably in alignment with the openings in the contact. This may be achieved by etching the GaN in a self-aligned fashion during the same lithographic step used to pattern the contact. The etched holes can extend into the p-layer 16 or can be etched as deep as the substrate 8.

(See col. 5, ll. 8-14 of Lester; emphasis added.)

To illustrate the difference between the one- and two-dimensional depressions forming convex elevations as claimed and the structure taught by Lester, applicants enclose herewith Figures A to C showing perspective views of the different structures according to the claimed invention and Lester, in which:

Figure A shows one-dimensional depressions forming convex elevations as claimed,

Figure B shows two-dimensional depressions forming convex elevations as claimed, and

Figure C shows the structure of Lester containing etched holes formed in a continuous layer.

As it becomes clear from the enclosed Figures A-C, all three structures illustrated have the same sectional view. Nevertheless, the structure taught by Lester (Figure C) clearly differs from those of the claimed invention (Figures A and B). More specifically, Lester's structure contains concave etched holes formed in the p-type layer 16 (see, also, Fig. 5 of Lester), rather than convex elevations formed by one- and two-dimensional depressions expressly recited in independent claims 1 and 46.

In light of the above illustration, one skilled in the art will appreciate that Lester merely teaches forming etched holes in a continuous layer 16. As applicants previously remarked, if such etched holes were viewed in a top down direction with the contact 20 removed, they are likely to resemble a pattern similar to the finely spaced pattern of openings in the contact 20, as shown in Fig. 1 and disclosed in column 3, lines 1-3 of Lester. Fig. 5 of Lester shows a sectional view of such etched holes in Lester's LED device and cannot be interpreted to show either one- and two-dimensional depressions or convex elevations, as asserted in the Office Action. Accordingly, Lester does not teach the above recited features of independent claims 1 and 46.

Moreover, Lester's layer 20 with etched holes is a current-spreading layer used to spread the current for driving Lester's device over the entire p-side (see, e.g., col. 3, ll. 11-15 or col. 2, ll. 18-23 of Lester). Consequently, one skilled in the art would not modify the etched holes of Lester to one- or two-dimensional depressions forming convex elevations as such elevations would not allow for a continuous layer 20 necessary for spreading current impressed by p-contact pad 21 over the entire p-side (see Fig. 1 of Lester). Therefore, the above recited features of independent claims 1 and 46 are not obvious over Lester.

In view of the above, independent claims 1 and 46 each patentably distinguish over Lester. Withdrawal of the 35 U.S.C. § 103(a) rejections of independent claims 1 and 46 is hereby respectfully requested.

B. Dependent Claims 2, 4-8, 10-18, 44-45, and 47-73

Dependent claims 2, 4-8, 10-18, 44-45, and 47-73, depend, directly or indirectly, from allowable independent claim 1 or 46. Therefore, these dependent claims are each allowable for at least the same reasons that independent claim 1 or 46 is allowable.

In addition, claims 2, 4-8, 10-18, 41, 44-45, and 47-73 include features which serve to even more clearly distinguish the present invention over the prior art of record. For example, claim 62 recites that "the second main face is a noncontinuous layer." In contrast, the second main face of Lester's device is a continuous layer (see Figure C of the enclosed illustration).

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited. Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

No fees or charges are required at this time in connection with the present application.
However, if any fees or charges are required at this time, they may be charged to our PTO
Deposit Account No. 03-2412.

Respectfully submitted,
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